

sun appears redder as it sinks towards the horizon, and loses more of its blue rays in the thicker atmosphere.

Gas and oil lights are richer in these penetrative rays than the arc light, which is peculiarly rich in the blue rays easily absorbed. Hence a gas jet can be seen a long distance in a fog, though, like the sun, it appears redder in tinge than usual. An arc light, on the other hand, is not seen far, however penetrative it may be in clear weather. I have often observed on London Bridge, in a fog, that the arc lamps become of a blank white; the brilliant arc seems to disappear, and the carbon points, slightly reddened, glow through the mist. The arc with its blue rays is the part which suffers most, and hence the larger the incandescent points in comparison, the likelier the light to penetrate. The ordinary electric incandescent lamp has, according to the late R. Sabine, 20 per cent. more orange rays than daylight, a fact which may account for its greater penetrative power than the arc; but, owing to its cost, it is debarred from lighthouse work.

On the whole it would appear advisable to employ the spectroscope in the South Foreland experiments, in order to find out what the absorptive action of mists is on arc, gas, and oil lights. If it should turn out, as above indicated, that the arc fails in penetration from lack of certain yellow, orange, and red rays, it might be useful to try the effect of supplying the needful rays by mixing certain salts with the carbons.

West Croydon

J. MUNRO

The Cholera Germ

THE importance of our gaining clear ideas of the cause of cholera as soon as possible prompts me to venture to suggest the direction in which may be sought an explanation of the three propositions in NATURE (p. 26), and which "E. K." there says "appear to me to be in hopeless contradiction." The propositions are, substantially, as follows:—(1) The comma-shaped bacillus is the cause of cholera; (2) the alimentary canal is the exclusive organ of its entrance into the body; (3) the comma-shaped bacillus is killed by acid.

The life of most plants is destroyed by passing through the alimentary canal of animals or man, yet seeds of grasses, grains of cereals, &c., not infrequently pass through animals without destruction, and afterwards germinate and reproduce their kind. Seeds of small fruits sometimes pass uninjured through the human body and through birds. Spores of bacilli are known to withstand treatment which is destructive of the bacilli themselves. Unless the comma-shaped bacillus is exceptional in not forming such spores, it seems to me that the three foregoing propositions may not only be thus explained, but that they may soon supply an explanation of what has been long waiting explanation, namely, the fact that the dejections of cholera patients are not often, if ever, found infectious when first voided, but soon become infectious. This accords perfectly with the three propositions if we suppose that the comma-shaped bacillus, soon after being voided in the dejections, forms spores which are capable of resisting the acids of the stomach. It seems very important to have this point investigated. To plead for such investigation, by whoever has opportunity, is a main object of this letter.

The many instances of the outbreak of cholera in this country (U.S.A.) immediately after infected baggage has been unpacked, might then receive easy explanation; the spores, being inhaled with the breath, would be likely to lodge in the posterior nares and pharynx, be swallowed, passed through the stomach, and in the nutritive alkaline fluids of the intestines find a congenial soil in which to germinate, forming comma-shaped bacilli giving off their poisonous by-product which seems to have such baneful influence on the human nervous system.

Lansing, Michigan, August 8

HENRY B. BAKER

School Museums

DR. GLADSTONE does not allude to botanical specimens in his communication to NATURE last week (p. 384), but these can form a very interesting addition. In my father's parish school of Hitcham, he had a long row of phials fixed against the wall of the class-room, with the name of every plant of the parish attached below. These were kept constantly supplied by the children all through the summer. Whoever first brought any species had a small reward. The School Herbarium was entirely made by the children; and for the last twenty-five years I have used for teaching purposes specimens dried, mounted, and

labelled by the children of Hitcham School. Should any one desire further details on the subject of botany in schools, I shall be very glad to communicate with such.

Drayton House, Ealing

GEORGE HENSLOW

THE circulating loan collections of natural history specimens, referred to by Dr. Gladstone in his letter on this subject as being established at Liverpool, have been provided and organised not by the School Board but by the Free Library and Museum Committee of the Corporation. They owe their origin almost entirely to the Rev. H. H. Higgins, chairman of the Museum Sub-Committee, and their great value is due to the close personal attention which that gentleman and the Curator of the Museum (Mr. T. J. Moore) have bestowed on them. The specimens included in the collections are not only typical, but are of excellent quality, and cannot fail to arouse the interest of the children before whom they are brought. So far as the experiment has already gone it has proved very successful, and deserves to be widely known.

Having had the pleasure of bringing the matter of these collections forward in the discussion on Dr. Jex-Blake's paper at the Educational Conference, I should be glad if you would allow me to make this correction as to their origin.

21, Verulam Street, Liverpool, Aug. 25

W. HEWITT

The Permanency of Continents

AS a small contribution to this theory, the Cornish beaches may furnish a quota. They are entirely composed of finely comminuted shells, with a small admixture of fragments of Bryozoa, spines of minute Echinoderms, and occasional mica flakes. Such sandy beaches occur in small bays, and if subjected to metamorphic action would form *lenticular masses of limestone* intercalated between the strata deposited above and below them. Hence such occurrences of limestone might well indicate such a *littoral* origin as is here displayed.

St. Ives

GEORGE HENSLOW

Carnivorous Wasps

I ONCE witnessed a somewhat similar feat to that mentioned by "F. N." (p. 385). It was at a wayside inn in the Eiffel. The tablecloth was covered with flies. The window was closed excepting one small corner at the top. A wasp entered, came direct to the table, but instead of attacking some stewed fruit thereupon, instantly seized a fly, bore it off, and after whirling round with it, made straight for the small means of exit and vanished.

One evening when at College a small beetle was flying round and round, but at some height over the lamp. A spider on the ceiling watching his opportunity, suddenly dropped upon it and caught it flying! He then ran up with it and began winding a belt of silk round its body. However the beetle ultimately managed to slip its meshes and escaped.

GEORGE HENSLOW

IN reply to your correspondent "F. N.," I would say that, while I do not recollect to have seen wasps, under natural conditions and in the open air, attacking flies, I have frequently seen a wasp, when shut up in a room, or supposing himself to be so (for wasps are very stupid in finding their way out of a room), attack and partially devour the common house-fly. I yesterday witnessed an instance of cannibalism on the part of the wasp. One of my drawing-room windows was closed, and on this seven or eight wasps were engaged in a fruitless struggle against the irritating and inexplicable glass, instead of escaping, as they might have done, through the other windows, which were open. One of them, more languid and weary than the rest, was crawling slowly up and down near the corner of the pane. Some minutes afterwards, looking up from my book, I noticed two of the other wasps engaged in furiously attacking this individual. After a few seconds, one of the opponents, perhaps endowed with higher moral susceptibilities than the other, flew away. The other seized upon the thorax of the now moribund wasp, and, after a few moments, began devouring him. I watched the process for a minute or two, and then the cover of a book put an end to the existence of the cannibal and of his prey.

A day without food reduces a wasp to a state of famine, and it might be easily ascertained whether he does not commonly,

like animals of a higher order, become a cannibal under these circumstances.

W. CLEMENT LEY

Lutterworth, August 22

I HAVE twice within the last few days noticed the same thing that your correspondent writes about, viz. wasps devouring flies. In the first instance the fly was found held fast by the feet of a wasp which I had killed; the fly was dead, but I think intact. In the second instance the body of the fly was reduced to a shapeless mass, and about half had been devoured, no doubt by the wasp. I had previously observed a wasp apparently attacking a butterfly (small white), possibly for the same purpose; it was, however, unsuccessful. I do not know whether it is unusual for wasps to do this, but I have certainly never observed it before.

H. N. DIXON

Northampton

THE question of your correspondent "F. N." in your last number (p. 385), inquiring whether the incident observed by him is an unusual occurrence or not, is one that has been so frequently asked that it is somewhat curious that the fact has not become recognised generally as constituting a regular habit of the insect. Four years ago several letters upon this subject were communicated to NATURE (*vide* vol. xxi. pp. 417, 494, 538, 563, and vol. xxii. p. 31), and many other notices of the practice might be quoted. Darwin related having observed a wasp seize and carry off a fly too large for convenient transport, which returned to the ground to cut off the wings to lighten its weight, and then flew away with it. During the hot months, butchers' shops, as I have frequently noticed, are much resorted to by wasps as a hunting-ground, and although they are also fond of the juice of dead meat, they are encouraged rather than destroyed, in consequence of the benefit they confer by their habit of preying upon "blow-flies," as I have more than once been told by the shopkeepers themselves.

WILLIAM WHITE

Highbury Hill, N., August 23

WITH reference to the account of the wasp and fly in NATURE by "F. N.", though not exactly an answer to the query put, still the following may be of some interest to him and others of your readers:—

I was sitting one day in an arbour in the grounds of Duff House, when a wasp and a bluebottle-fly fell at my feet. Here a scuffle (it could scarcely be called a fight) ensued, which lasted a few seconds. I think the wasp used its sting as well as its mandibles. The fly dead, the wasp then tried to lift it. This was frequently repeated, but without avail. The wasp then went round and round and over the fly several times. Then another trial. But no; it seemed to me that the fly was too heavy or too bulky. The wasp now began to nibble at the body of its prostrate victim, and at last severed it in two. It then seized one portion, and after making the attempt twice, succeeded, rose, and disappeared. In a little while, however, I was rather surprised to see the wasp return; at least one similar came, and having whizzed round about my head, looked at me, went and hovered for an instant or so above the spot where the other half of the fly lay, then alighted, and bore it off in triumph. I do not think that the wasp intended to eat the fly, but rather meant it as food for the larvæ at home.

THOMAS EDWARD

Banff, Scotland

SEEING the communication of "F. N." on a "Carnivorous Wasp" in last week's NATURE brings to my recollection a similar observation of my own about a fortnight ago. My attention was drawn to an immense number of wasps and flies feeding together, apparently in perfect amity, at the bottom of a recently emptied sugar hogshead that was lying on its side in the sun. The amity, I may say, was not altogether perfect, as when a wasp approached a fly the latter speedily gave way. Suddenly a wasp, which was flying about in the interior of the tub, darted on an unsuspecting fly which was peacefully regaling itself with sweets, and carried it off. I managed to trace its flight to a neighbouring wall, where I saw the wasp apparently busily engaged in devouring the fly. On approaching more closely, in order to find out if I could what these unamiable proceedings were, I disturbed the wasp, which flew away with the fly still in its grasp, and this time I was unable to follow it. My impres-

sion at the time was, I remember, that the wasp wished to rob the fly of its sugar. This was the only case I noticed.

Leicester, August 25

E. F. BATES

[We have received numerous letters of the same purport as the above. The subject was discussed in NATURE, vols. xxi. and xxii., as referred to by Mr. White above.—ED.]

Fireballs

WHILST speaking of the electric discharge to the Rev. Canon Thomas, of Meifod, a few days ago, he told me that he was some years ago overtaken by a most violent storm of thunder and lightning whilst crossing on horseback a Merionethshire mountain. During this storm Mr. Thomas saw (what appeared to him to be) three balls of fire successively hurled to the ground near him from the clouds.

About a fortnight ago a sudden and violent thunderstorm broke over North-East London, when at least one building was struck. The window of my room was wide open at the top. During one of the peals of thunder a zigzag line of lightning was distinctly seen by me (and another person) to come into the room by the open window and form an irregular line of fire along the cornice of the room. In the middle of the zigzag there seemed to be a momentary stoppage, with a star-like expansion of the line. There was no reflection or optical illusion, and no damage was done.

W. G. SMITH

A Cannibal Snake

I SEND the following brief history of a snake's meal off another about his equal in bulk.

Some years since I was amused at the conduct of a small triangular-headed snake about ten inches long that I encountered in a road, who coiled himself and struck at me as if to dispute my progress. He was a pretty little fellow, gray spotted, and I picked him up, and carrying him home, deposited him in a small fish globe with sand and stones in the bottom. Here he lived contentedly for several months without eating anything, although frequently tempted with various insects and other food. After three months or so, my neighbour's children brought in a small black snake, shorter, but rather larger in diameter than my pet, and we decided to place the two together. Scarcely had the new-comer touched the sand than my pet glided rapidly around the sides of the globe, and struck him with his fangs just behind the head. The black snake dropped apparently lifeless, the other retained his hold with his jaws, and winding his tail closely about midway up the body, stretched himself out and his prey at the same time, till he seemed to dislocate his vertebra. We could hear the black snake crack. An hour or so later I found that he had begun to swallow him, having already got the head fairly inside his jaws. I called my family and neighbours, and we watched the process for several hours. He coiled the lower part of his body around his prey at the distance of an inch or two from his jaws, so tightly that it seemed almost to cut it in two, and then appeared to curl himself together and force the portion between the coil and his jaw down his throat. When that portion was ingested, he took a fresh hold lower down and repeated the action. The black snake disappeared quite rapidly, until the amount swallowed distended and stiffened the other, so that he could not hold it with a coil. After this the process was slow and tedious, apparently being mainly carried on by alternate retractions of the jaws, and it took nearly half an hour to dispose of the last inch, which was of course very small. Finally he succeeded, and lay stretched out, a singular-looking specimen, his outline distorted by the convolutions of the reptile he had swallowed, which could plainly be traced through his distended skin. He lay quiet for several days, and apparently digested the greater portion of it. I never fed him again, and finally turned him loose, his parting salute being a vicious attack upon my boot.

C. F. CREHORE

Newton, Massachusetts, August 12

WATER BELLS

THE accompanying design (from *La Nature*) represents a water bell, the invention of M. Bourdon, of more transparent and complete effect than those hitherto produced, which have all either made the water issue by a very diminutive annular orifice, or shot the liquid jet